



Clinical evaluation of consciousness in the ICU



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Chargée de recherches FNRS
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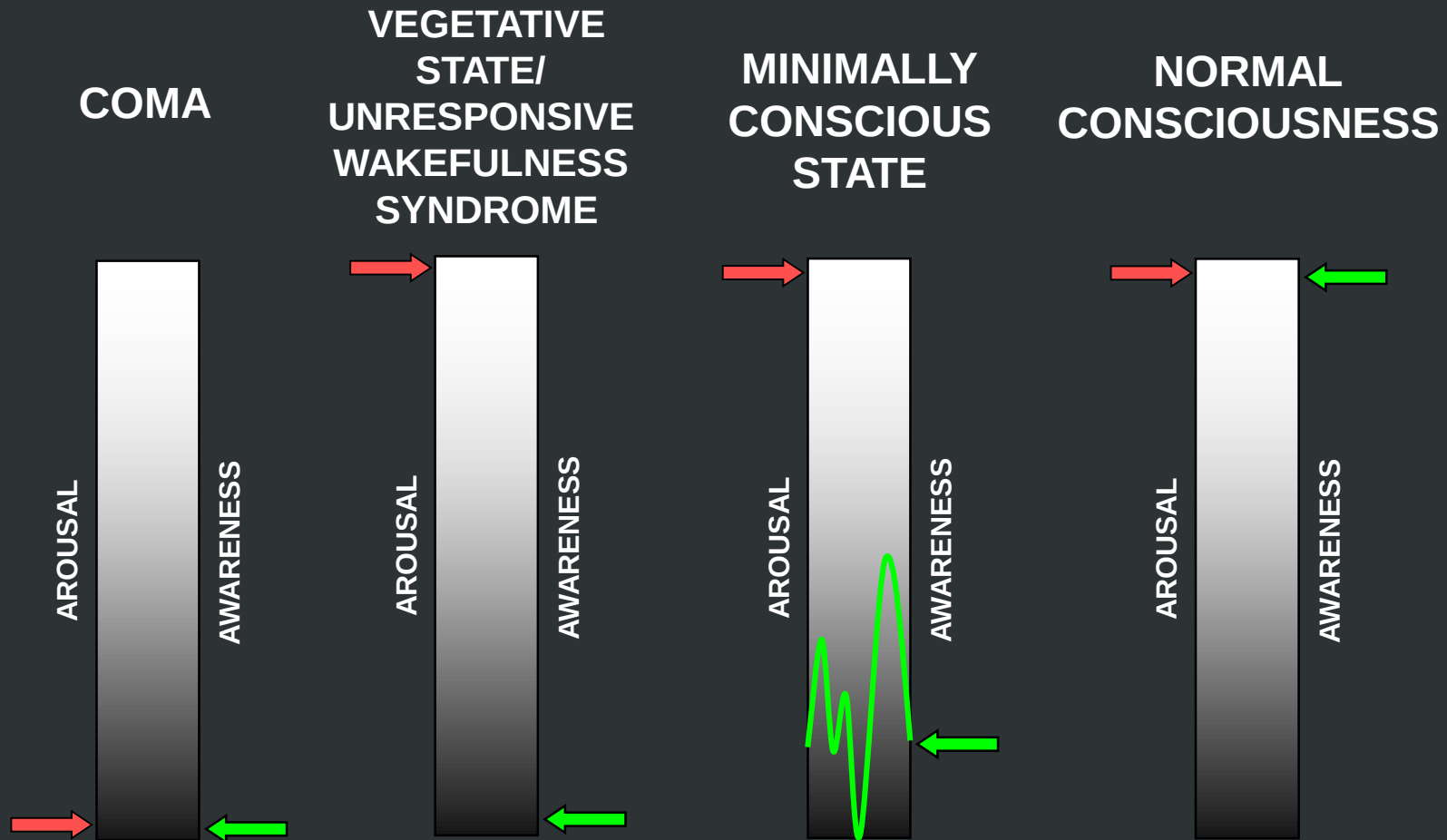


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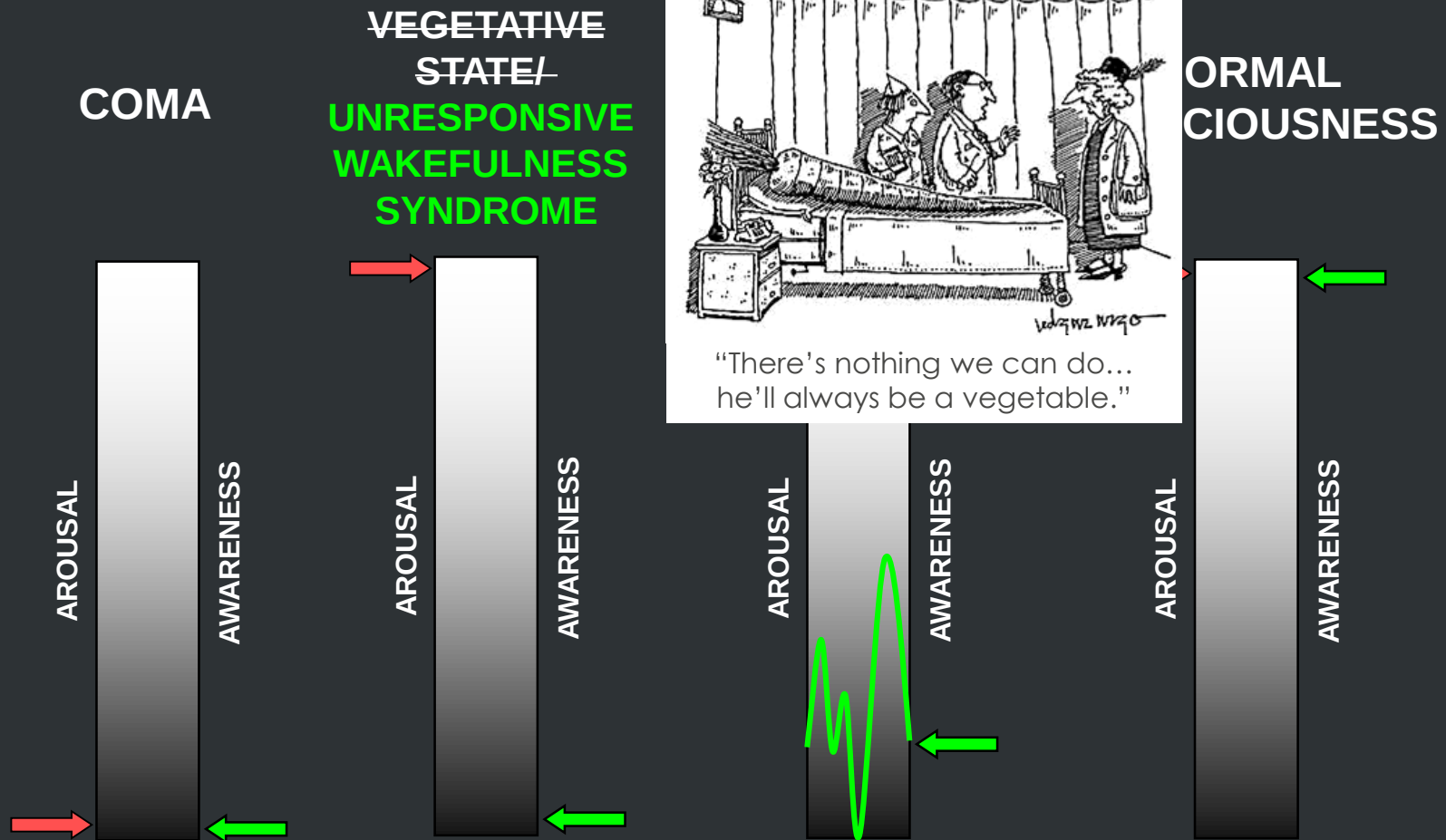
CONSCIOUSNESS

2

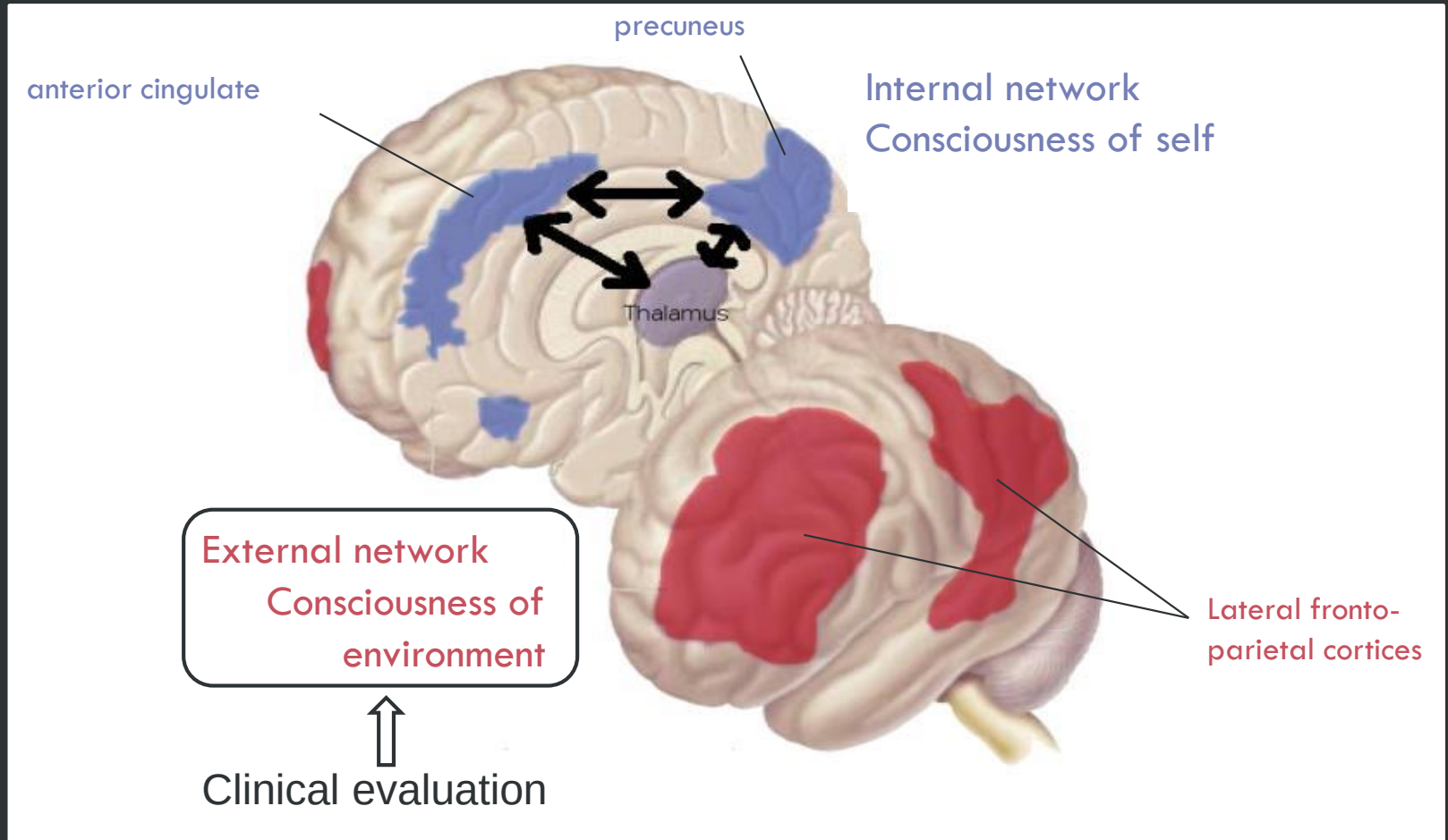
What's consciousness?



What's consciousness?



2 networks



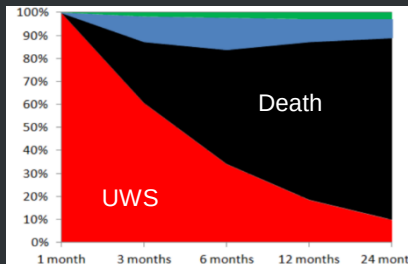
Why do we need an accurate diagnostic?

- Misdiagnosis ~ 40% w/o validated & sensible scale
- Prognostic, therapeutic and ethical implications

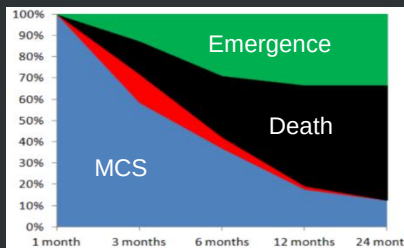
Prognostic

(non traumatic)

UWS at 1 month



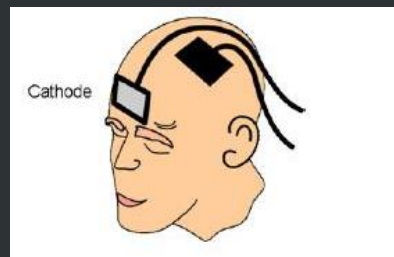
MCS at 1 month



Cassol et al, in prep

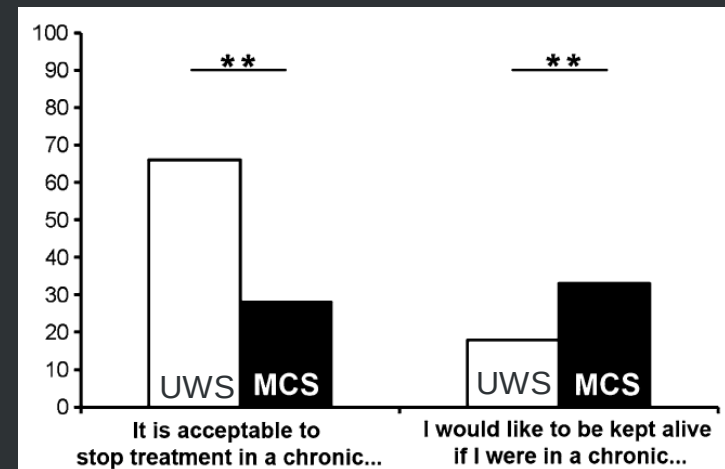
Treatment

MCS > UWS



Thibaut et al, *Neurology* 2014

Ethics / end-of-life decisions



Demertzi et al, *J Neurology* 2011

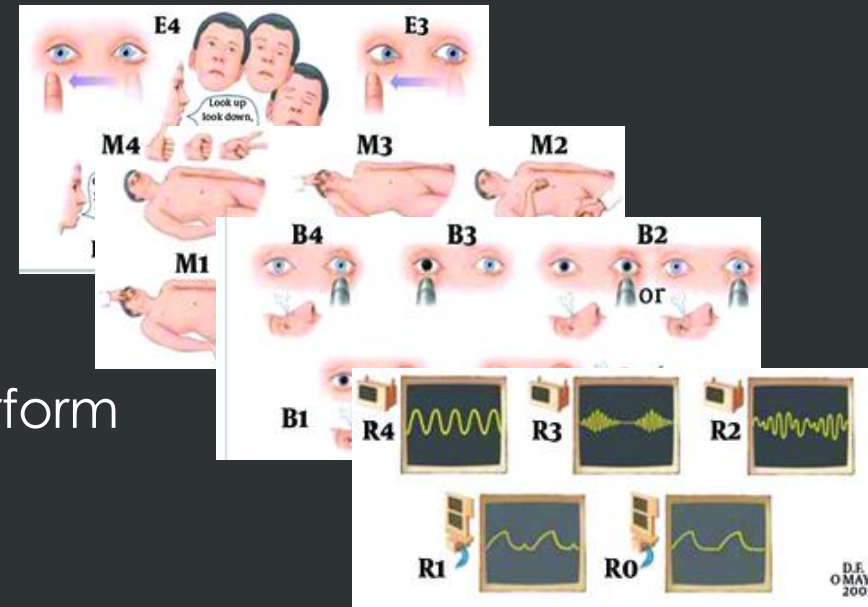


Glasgow Coma Scale (GCS)

- Total score (/15) = 3 subscales :
 - Motor response (/6)
 - Verbal response (/5)
 - Eyes opening (/4)
- **Advantages:** Short, easy, done/known worldwide
- **Limitations:**
 - ➔ Difficult to differentiate small changes in states of consciousness
 - ➔ Does not assess visual pursuit (1st sign of consciousness & LIS !)

Full Outline of UnResponsiveness (FOUR)

- Total score (/16) = 4 subscales :
 - Eye response (/4)
 - Motor response (/4)
 - Brainstem reflexes (/4)
 - Respiration (/4)



- **Advantages** : Short & easy to perform
Assess visual pursuit

- **Few limitations** :
 - Does not include ALL criteria for MCS
 - Not well adapted in rehab centres



Coma Recovery Scale – Revised (CRS-R)

□ Total score (/23) = 6 subscales :

- Auditory function (/4)
- Visual function (/5)
- Motor function (/6)
- Verbal function (/3)
- Communication (/3)
- Arousal (/3)

+ Brainstem reflexes & contextualized emotional responses

! Total score $\neq$ diagnosis
> 10 → MCS

JFK COMA RECOVERY SCALE - REVISED ©2004									
Record Form									
Patient:		Date:							
AUDITORY FUNCTION SCALE									
4 - Consistent Movement to Command *									
3 - Reproducible Movement to Command *									
2 - Localization to Sound									
1 - Auditory Startle									
0 - None									
VISUAL FUNCTION SCALE									
5 - Object Recognition *									
4 - Object Localization: Reaching									
3 - Visual Pursuit *									
2 - Fixation *									
1 - Visual Startle									
0 - None									
MOTOR FUNCTION SCALE									
6 - Functional Object Use †									
5 - Automatic Motor Response									
4 - Object Manipulation *									
3 - Localization to Noxious Stim									
2 - Flexion Withdrawal									
1 - Abnormal Posturing									
0 - None/Flaccid									
OROMOTOR/VERBAL FUNCTION SCALE									
3 - Intelligible Verbalization *									
2 - Vocalization/Oral Movement									
1 - Oral Reflexive Movement									
0 - None									
COMMUNICATION SCALE									
2 - Functional: Accurate †									
1 - Non-Functional: Intentional *									
0 - None									
AROUSAL SCALE									
3 - Attention									
2 - Eye Opening w/o Stimulation									
1 - Eye Opening with Stimulation									
0 - Unarousable									
TOTAL SCORE									

Why the CRS-R ?

- Most sensitive to detect signs of consciousness → MCS
- Guidelines (administration & scoring)
- Excellent internal validity & test-retest reliability
- The only scale that includes all the criteria of the Aspen group for MCS
- Operational definition for each item
- Possibility to identify confounding factors (deafness, aphasia, blindness) when improbable scores occur



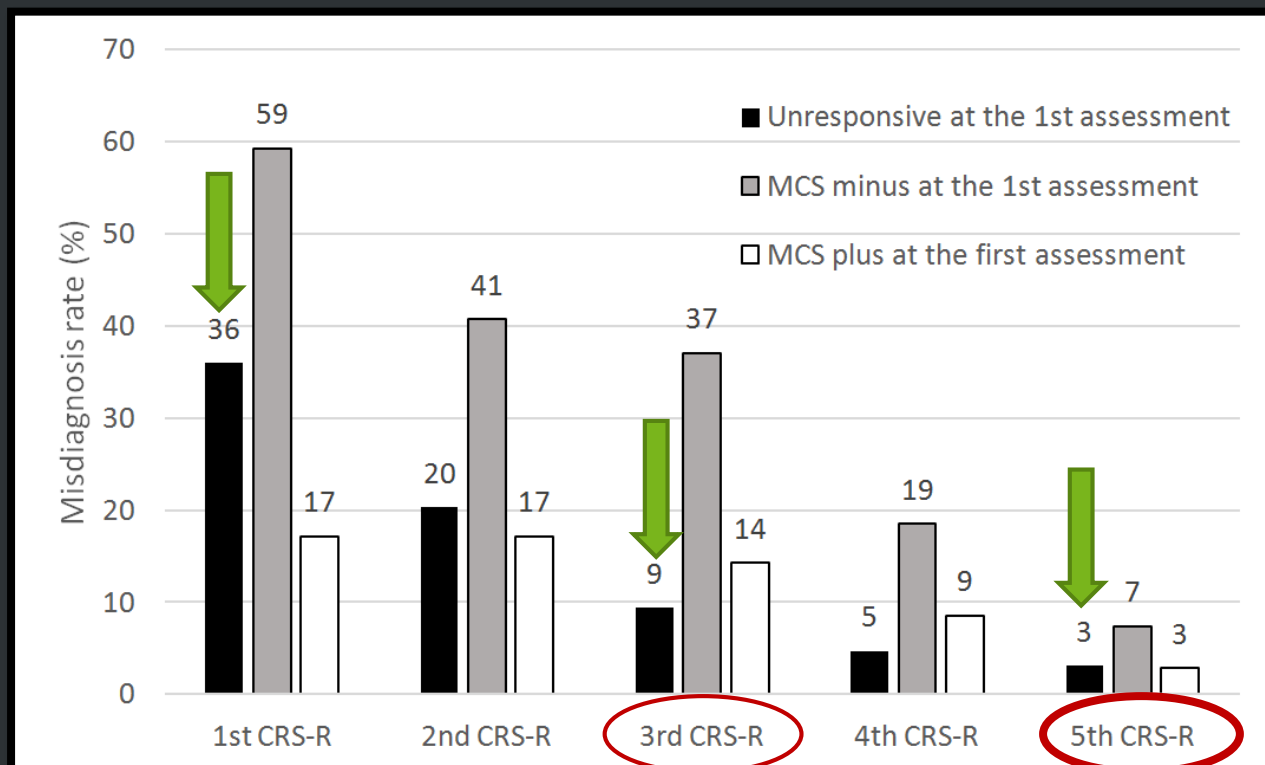
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CONSCIOUSNESS

10

How many assessments ?

- ❑ Min 5 assessments
3 -10 j
- ❑ Chronic patients
(> 28 days)
- ❑ 1X → high rate
misdiagnosis



Most frequent behaviors ?

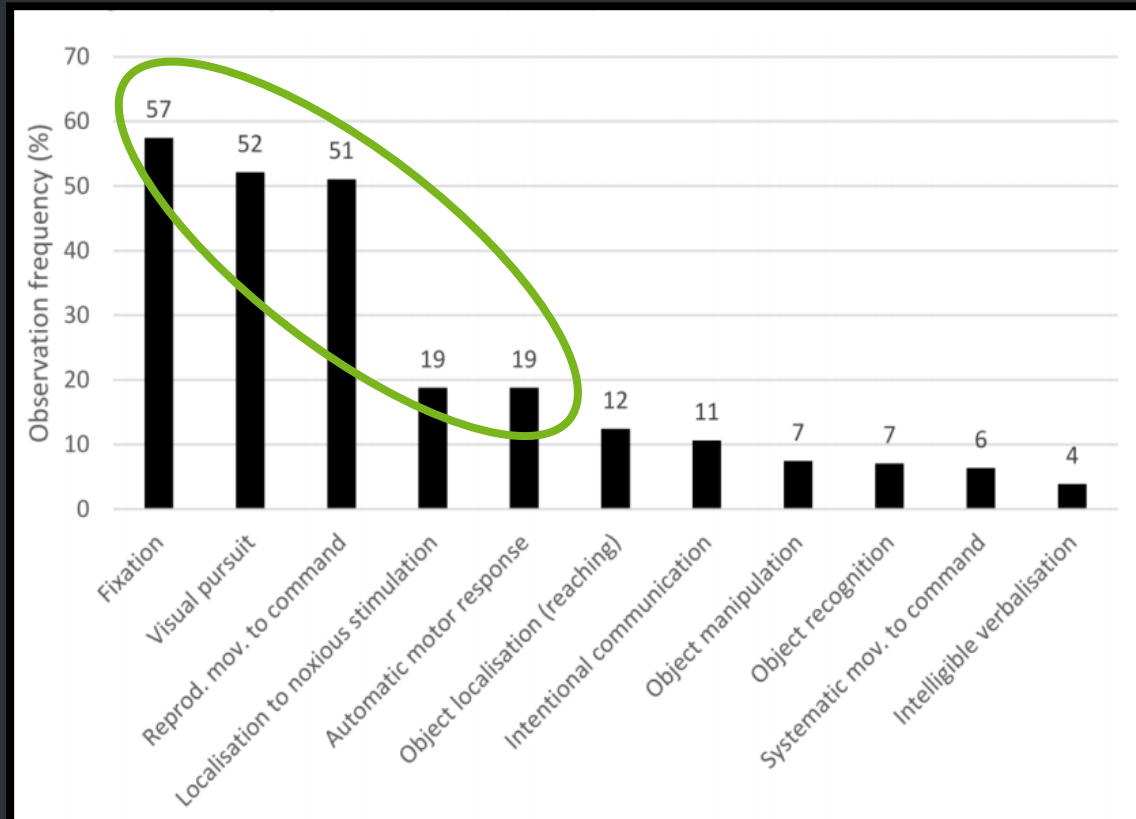
CRS-r of 282 patients

□ 5 items

- Fixation
- Visual pursuit
- Command following
- Localization to pain
- Automatic motor react°

□ If only 1 sign ?

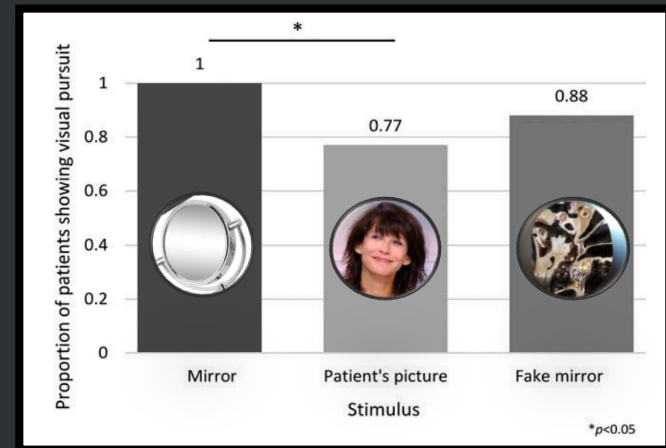
→ 99%



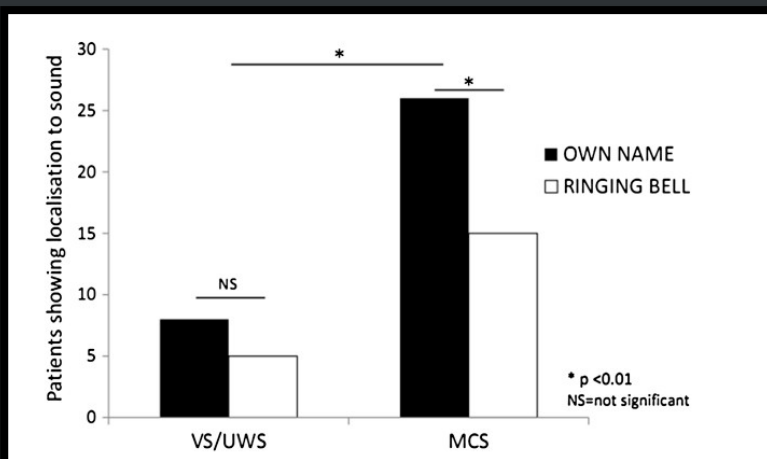
Clinical application

Visual pursuit → 1st sign to be recovered
Use a mirror (auto-referential, bright & dynamic → attracts attention)

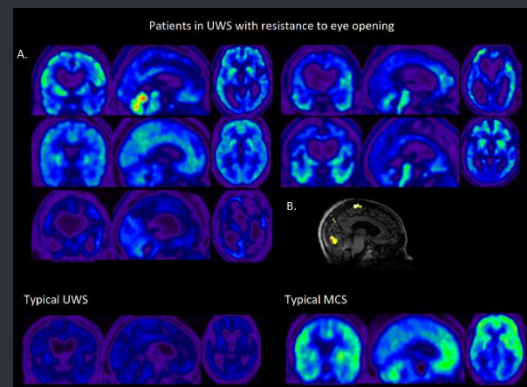
Localisation to sounds
→ patient's own name



Wannez et al., *Brain Inj*, 2017



Cheng, L. ; Gosseries, O. & al., *BMC Neurology*, 2013



van Ommen et al., *J Neurology*, 2019

Resistance to eyes opening
6/23 UWS
→ preserved brain metabolism
MCS?

Nociception Coma Scale-Revised

13

Assessing pain in
non-communicative
patients → NCS-R

REPONSE MOTRICE

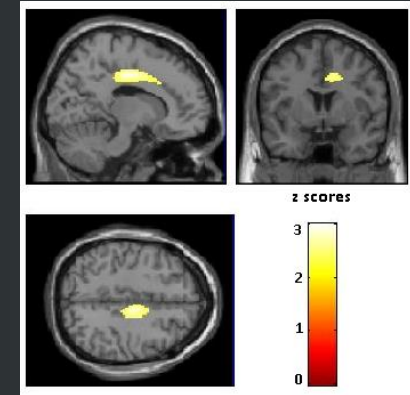
- 3 – Localisation de la zone douloureuse
- 2 – Flexion en retrait
- 1 – Posture anormale stéréotypée
- 0 – Néant

REPONSE VERBALE

- 3 – Verbalisation intelligible
- 2 – Vocalisation
- 1 – Grognement
- 0 – Néant

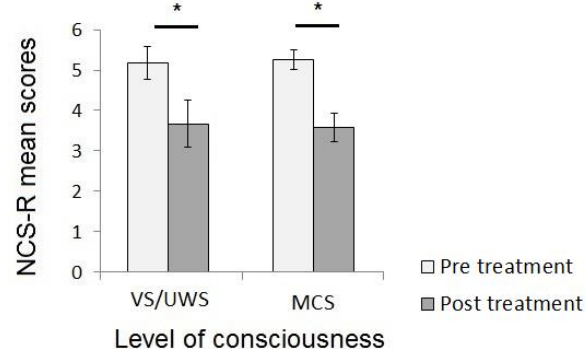
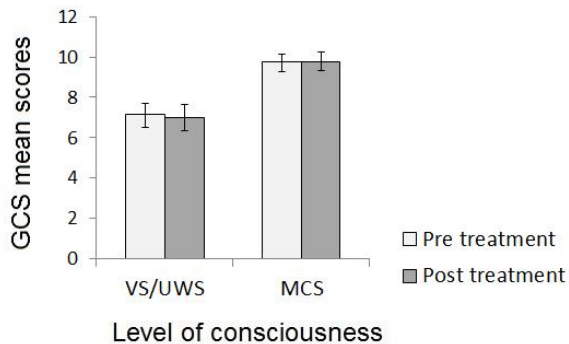
EXPRESSION FACIALE

- 3 – Pleurs
- 2 – Grimace
- 1 – Mouvements oraux réflexes
- 0 – Néant



Total score : 0-9
Pain threshold > 4

In ICU





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CONSCIOUSNESS

14

Conclusion

USE the CRS-R – level of consciousness – UWS vs MCS

- + includes all MCS criteria & guidelines (administration & rating)
- Use a mirror & patient's own name → auto-referential stimuli
- 5 most frequent items (VP, VF, command following, localisation to pain, automatic motor reaction)
- One assessment is NOT enough !

USE the NCS-R

- > 4 → potential pain
- + evaluate antalgic treatment

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CRS-R workshop in Liège this fall

Thank you

